Claims

1.   A method for assisting a mobile terminal in an unsynchronised wireless communications network to determine its location using a global positioning system (GPS) by providing a GPS receiver of the mobile terminal with reference time data, said method including:

obtaining a first time signal that is substantially synchronised with the GPS time,

determining a latency time indicative of least an approximate network latency for the transmission of the reference time data through the network to the mobile terminal;

generating the reference time data based on the first time signal and the latency time; and

transmitting at least the reference time data to the mobile terminal.

2.   A method as claimed in claim 1 wherein the generating the reference time data includes adding the latency time to a time derived from the first time signal.

3.   A method as claimed in claim 1 wherein the reference time data includes data derived from the first time signal and latency time.

4.   A method as claimed in claim 1 in which the method includes: determining the latency time by estimating the network latency.

5.   A method as claimed in claim 1 in which determining the latency time includes:

obtaining demodulated time data that is substantially synchronised with the GPS time from a GPS receiver associated with a second terminal in communication with the network,

receiving at the second terminal the reference time data; and

comparing the demodulated time data to the reference time data to determine the latency time associated with the transmission of the reference time data to the second terminal.

6.   A method as claimed in claim 5 in which the second terminal is a mobile terminal.

7.   . A method as claimed in claim 1 wherein, obtaining a first time signal includes receiving an initial time signal that is substantially synchronised with Coordinated Universal Time (UTC) and applying a correction to the initial time signal to obtain a time signal that is substantially synchronised with GPS time.

8.   A method as claimed in claim 7 in which the initial time signal is received from a network time protocol server.

9.   A method as claimed in claim 1 in which the wireless communications network is selected from the following types of network:

a GSM network, a UMTS network.

10.   A method as claimed in claim 1 in which the time of arrival of the reference time data at the mobile terminal is within three seconds of a time value that forms part of the reference time data.

11.   A method as claimed in claim 10 in which the time of arrival of the reference time data at the mobile terminal is within two seconds of a time value that forms part of the reference time data.

12.   A method as claimed in claim 1 in which time of arrival of the reference time data at the mobile terminal is substantially equal to a time value forming part of the reference time data

13.   A method for assisting a mobile terminal in an unsynchronised wireless communications network to determine its location using a global positioning system (GPS) by providing a GPS receiver of the mobile terminal with reference time data, said method including:

obtaining a first time signal that is substantially synchronised with the GPS time,

determining a latency time indicative of least an approximate network latency for the transmission of the reference time data through the network to the mobile terminal;

generating the reference time data based on the first time signal and the latency time; and

transmitting at least the reference time data to the mobile terminal; wherein the latency time is determined by:

obtaining demodulated time data that is substantially synchronised with the GPS time from a GPS receiver associated with a second terminal in communication with the network,

receiving at the second terminal the reference time data; and

comparing the demodulated time data to the reference time data to determine the latency time associated with the transmission of the reference time data to the second terminal.

14. A method as claimed in claim 13 wherein the generating the reference time data includes adding the latency time to a time derived from the first time signal.

15. A method as claimed in claim 14 in which the first time signal is derived from a time signal provided by a network time protocol server.

16. A method as claimed in claim 15 in which the wireless communications network is a GSM network.

17. A method as claimed in claim 15 in which the wireless communications network is a UMTS network.

18. A method as claimed in claim 13 in which the time of arrival of the reference time data at the mobile terminal is within two seconds of a time value that forms part of the reference time data.

19. A method as claimed in claim 13 in which time of arrival of the reference time data at the mobile terminal is substantially equal to a time value forming part of the reference time data

20. A method for generating a reference time for assisting a global positioning system (GPS) receiver of a mobile terminal in an unsynchronised wireless communications network to determine its location, said method including:

obtaining a first time signal that is substantially synchronised with the GPS time,

determining a latency time indicative of least an approximate network latency for the transmission of reference time data through the network to the mobile terminal;

generating the reference time based at least on the first time signal and the latency time.

21.   The method of claim 20 in which the reference time is generated by adding the determined latency time to a time derived from the first time signal.

22.   The method of claim 21 in which the latency time is determined by:

obtaining demodulated time data that is substantially synchronised with the GPS time from the GPS receiver associated with a mobile terminal in communication with the network,

receiving time data derived from first time signal at the mobile terminal ; and

comparing the demodulated time data to the received time data to determine the latency time for the transmission of the received time data to the mobile terminal.

23.   The method of claim 22 including:

receiving the latency time from the mobile station at a location centre of the wireless network; and

generating, at the location centre the reference time based at least on the first time signal and the received latency time.

24.   The method of claim 22 in which the determined latency time is stored in a memory associated with the mobile station and the reference time is generated at the mobile station by combining the stored latency time with a time derived from the first time signal.

25.   A signal for use by a mobile terminal of an unsynchronised wireless communications network to determine its location using a global positioning system (GPS), said signal including a reference time data portion generated on the basis of a first time signal that is substantially synchronised with GPS time, and a latency time

indicative of least an approximate network latency for the transmission of the reference time data portion of the signal through the network to the mobile terminal.

26. · The signal of claim 25 wherein the reference time data portion includes data indicative of a reference time that leads the GPS time at the time of transmission of
5   the reference time data portion by an amount substantially equal to said latency time.

27.   . The signal of claim 25 wherein the reference time data portion includes data indicative of the GPS time at the time of transmission of the reference time data portion, and data indicative of said latency time.

28.   The signal of claim 25 wherein the reference time data portion includes
10   data representing a reference time.